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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/808,138	03/24/2004	Samuel Fineberg	200314538-1	5258

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HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER
TSUI, DANIEL

ART UNIT	PAPER NUMBER
2185	

NOTIFICATION DATE	DELIVERY MODE
02/26/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

JERRY.SHORMA@HP.COM
mkraft@hp.com
ipa.mail@hp.com

Office Action Summary	Application No.	Applicant(s)	
	10/808,138	FINEBERG ET AL.	
	Examiner	Art Unit	
	DANIEL TSUI	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 November 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amended title has been considered and accepted by the Examiner.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1, 2, 8, 10, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang (US 7,251,713) in view of RDMA ("An Overview of RDMA over IP").

As per claim 1, Zhang teaches a persistent memory access system comprising:

A primary region corresponding to a predefined portion of a primary network persistent memory unit communicatively coupled to at least one client processor via a communication system (primary storage controller 108 and storage 116, see figure 1), wherein the primary region is assigned to a client process on a client processor node and is configured to store information received from the client process (it is an inherent property of network attached storage devices to store information from the client processor nodes; see column 5, lines 34-38);

a mirror region corresponding to a predefined portion of a mirror nPMU communicatively coupled to the client processor node via the communication system (secondary controller 112 and storage 118, see figure 1; column 5, lines 7-9), wherein

the mirror region is assigned to the client process and is configured to store the information received from the client process.

Zhang does not teach the memory units being coupled to the processor nodes over a remote direct memory access enabled communication system that executes single byte RDMA requests received through the network interface. The non-patent literature teaches the use of RDMA as a way for connecting memory units across a network (see page 2, last paragraph). It would have been obvious at the time the invention was made to a person of ordinary skill in the art for the network persistent memory units taught by Zhang to be connected over an RDMA enabled communication system so that the memory units can be directly accessed by the processes running on each client.

As per claim 2, Zhang teaches that the nPMUs are physically separate units and are characterized by separate fault domains (see column 4, lines 59-61).

As per claim 8, Zhang teaches the system further comprising a persistent memory unit library residing in the client load that comprises functions that permit directly writing and reading information to the regions (interface software 307, see figure 2 and column 5, lines 62-65).

As per claims 10 and 11, Zhang teaches the system further comprising a persistent memory manager coupled to the processor node for creating the primary and mirror regions on the storage devices (the storage controllers 108 and 112 serve to control the storage areas 116 and 118 and allow data to be stored on the devices). This functionality would include allocating and deallocating regions for use.

4. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang in view of RDMA and further in view of Golding (US 6,477,617).

As applied in the rejection above, the combination of Zhang and RDMA teaches a persistent memory access system with a primary region and a mirror region. The combination does not teach the memory regions comprising virtual addresses corresponding to the physicals locations where the information is stored. Golding teaches a memory storage system that uses virtual addresses so that data can be stored across multiple physical devices while still appearing to be on one storage (see column 8, lines 45-56). Golding also teaches translating between the virtual addresses to physical addresses. It would have been obvious at the time the invention was made to a person of ordinary skill in the art to use virtual addresses for both the primary storage region and the mirror region so that the data stored to these regions can be stored across multiple physical devices while appearing to be on a single unit. It would have also been obvious to perform the address translation so that the clients using virtual addresses can access the physical locations where data is to be stored.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang in view of RDMA and Golding and further in view of Olson (US 5,479,628).

As applied in the rejection above, the combination of Zhang, RDMA, and Golding teaches a persistent memory access system that uses virtual addresses. The references do not teach using a base pointer corresponding to a difference in the

primary virtual address and the corresponding client address for translating. Olson teaches a system that translates virtual to physical addresses and uses a base pointer. It would have been obvious for the claimed system to also use a pointer to perform virtual to physical address translation since it is necessary in a known technique of performing such address translations.

6. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang in view of RDMA and further in view of Garg (US 7,266,645).

As applied in the rejection above, the combination of Zhang and RDMA teaches a persistent memory access system with a primary region and a mirror region. The combination does not teach the system comprising metadata identifying the regions assigned to the client process or caching the metadata. Garg teaches a system that uses metadata for data objects, the metadata including locations that the data is stored (see column 4, lines 8-11). Garg also teaches caching the metadata (cached metadata 90b, see column 3, lines 47-49). It would have been obvious at the time the invention was made to a person of ordinary skill in the art to use metadata to identify the regions where the data is stored and to cache the metadata so the system can access it without having to go to the storage.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zhang in view of RDMA and further in view of API (IEEE dictionary).

As applied in the rejection above, the combination of Zhang and RMDA teaches a persistent memory access system with a primary region and a mirror region. The combination does not teach an API residing in the client node that causes the client process to access the functions of the PMU library. However, it was well known in the art at the time the invention was made for computer systems to use APIs as the interface between applications (i.e. the client process) and the system (see definition in IEEE dictionary). Therefore it would have been obvious for the client processor node to include an API that would allow the client processes to access the library functions that perform reading and writing to the storage devices.

Response to Arguments

8. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Tsui whose telephone number is (571)270-1022. The examiner can normally be reached on M through F, 8:00-4:30 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571)272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. T./
Examiner, Art Unit 2185

Daniel Tsui

/Sanjiv Shah/
Supervisory Patent Examiner, Art Unit 2185